Urban heating and canopy cover need to be considered as matters of environmental justice

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Ziter et al. (1) make a significant contribution to the understanding of temperature anomalies in a city of the northern United States. Their most important finding is that positive temperature anomalies were reduced most strongly in areas with canopy cover >40%. The authors call for increasing urban canopy cover, especially in areas that already have ≥40% canopy cover. However, the work would be strengthened by considerations of the realities of urban form, urban forest dynamics, human behavior, and environmental justice.

Planting trees in areas with ≥40% canopy cover may lead to highest increases in marginal cooling. However, the greatest need for cooling is in areas with <40% canopy cover. These areas are heating up the most. Typically, these are also low-income areas with lower heat-adaptive capacity, putting residents at increased risk of heat stress (2). However, low-income earners are also more likely to rent their dwelling (3) and cannot plant trees without a landlord's consent.

The study's supplemental data show that ∼80% of all observations are <50% canopy cover, and 43 to 56% of all observations are <20% canopy cover. The authors do not provide data on residential density, but other studies show that canopy cover is negatively associated with residential density and positively associated with household income (4). Focusing efforts to increase canopy cover on the areas with higher canopy cover classes may not only increase environmental injustice but may also disadvantage the majority of the urban population.

While laudable, the authors' call for increasing canopy cover overlooks realities of urban form. It is difficult to plant many trees and keep them alive where impervious surface is very large (5). Alternatively, impervious areas could be removed and replaced with pervious surfaces that might be more suitable to the planting of trees. However, this would require a drastic change in urban form with associated cost factors. Under current fiscal realities, it is hard to imagine municipalities embarking on such an undertaking (6).

We need to understand better why some areas have very low canopy coverage. The average life expectancy of an urban street tree is 19 to 28 y (7), which means many trees die before they can deliver substantial benefits. Why is this so, and how can we increase the average life expectancy of urban trees? Within and across cities, low-income communities tend to have less access to high-quality green spaces than high-income communities (8, 9). In an age of austerity, these inequities are reinforced by communities having to compete against each other for the remaining funding (9). Such funding structures continue systematic and institutionalized marginalization of low-income communities, which needs to be better understood and changed.

Finally, more knowledge about actual human behavior and heat exposure is required. New ways of measuring heat exposure go beyond ambient temperature anomaly to using body-worn temperature sensors. Combined with Global Positioning System data and participant diaries, these approaches can increase understanding of heat exposure among urban residents (10).

Stronger consideration of the above issues would enhance the practical relevance of the study findings for informing urban climate resilience strategies.

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